

Application for Letters Patent of

the UNITED STATES OF AMERICA by -

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Being a citizen of -

THE UNITED STATES OF AMERICA

For:

ARC STACK HOUSING WITH ARC PLATE LATCHING MECHANISM

Customer No. 23569

TITLE OF INVENTION

Arc Stack Housing with Arc Plate Latching Mechanism

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable

5 STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR  
DEVELOPMENT

[0002] Not Applicable

BACKGROUND OF THE INVENTION

Field of Invention

10 [0003] This invention pertains generally to arc stacks in electrical switches.  
More particularly, this invention pertains to an apparatus for housing and securing  
arc plates.

BRIEF SUMMARY OF THE INVENTION

15 [0004] An apparatus for housing and securing a plurality of arc plates in an  
arc extinguishing chamber or arc stack is provided. The apparatus includes a  
latching mechanism that positively locks the arc plates, which are included in a  
switch arc stack for an electrical switch. Each of a plurality of arc plates in the arc  
stack are inserted in a slot defined by securing ledges extending from securing  
members or side walls. The arc stack slots have a rear stop that prevents the arc  
20 plate from being pushed through the stack and the slot has a locking tab that,  
when it returns to its normal position after the arc plate is inserted into the slot,  
positions and positively secures the arc plate in the stack. The rear stop and  
locking tab are resilient and apply force against the arc plate, preventing the arc  
plate from vibrating in the arc stack housing.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0005] The above-mentioned features of the invention will become more clearly understood from the following detailed description of the invention read together with the drawings in which:

- 5       Figure 1 is a perspective view of a arc stack housing for the arc plates;  
Figure 2 is a cutaway view of the arc stack housing and one arc plate;  
Figure 3 is a perspective cutaway view of the arc stack housing; and  
Figure 4 is a perspective view of an arc plate.

DETAILED DESCRIPTION OF THE INVENTION

10      [0006] An apparatus for housing and securing an arc plate in a arc extinguishing chamber or arc stack is disclosed. An arc stack includes a housing containing a plurality of arc plates.

15      [0007] Figure 1 illustrates an arc stack housing such as can be used in any blade type electrical switch. Those skilled in the art will recognize that arc stacks are used in many types of switches and the present invention is not limited to arc stacks having the illustrated configuration.

20      [0008] The illustrated arc stack housing **102** includes two substantially parallel housing walls **112** and **114**. In the illustrated embodiment, the housing walls **112** and **114** are secured to each other in a spaced relationship by an upper member **116** and a lower member **316** (Figure 3). The upper member **116** includes a longitudinal notch **118** that corresponds with the notches **404** in the arc plates **402** (Figure 4). The lower member **316** has a longitudinal notch **318** that corresponds with the notches **404** in the arc plates **402**. These notches, **118**, **318** and **404**, allow the switch blade (not illustrated) to pass freely through the arc stack. Also illustrated, in general, are protrusions **122** and **124** that are used for attaching and securing the arc stack housing **102** inside the switch. Those skilled in the art will recognize that the configuration of the arc stack housing **102** can

vary to meet the configuration of the switch into which the arc stack is used without departing from the spirit and scope of the present invention.

**[0009]** Figure 2 is a cut-away plan view showing the inside face of one wall  
112. Figure 3 is a cut-away perspective view showing the inside face of one wall  
5   **112**. Figure 2 illustrates a section of a fully installed arc plate 402 in the lowermost position and a partially installed arc plate 402' in the adjacent upper position. Figure 4 illustrates an arc plate 402, which has a leading end 418 with a notch 404, a pair of longitudinal edges 412 and 414, and a trailing end 416. Figures 2 and 3 illustrate five slots 216, and each slot 216 is adapted to receive an 10 arc plate 402. Those skilled in the art will recognize that the number of slots 216 can vary without departing from the spirit and scope of the present invention.

**[0010]** The arc stack housing 102 includes members for securing a plurality of arc plates 402 in the housing 102. Referring to Figures 2 and 3, a number of generally parallel securing ledges 210 protrude from the housing wall 112. Each 15 securing ledge 210 defines a lower surface 212 and an upper surface 214. The opposed upper surface 214 and lower surface 212' of the generally parallel securing ledges 210 and 210' define slots 216 into which the arc plates 402 slide. The longitudinal edge 412 of the arc plate 402 is adjacent to the housing wall 112 when the arc plate 402 is inserted into the slot 216. The slot 216 for receiving the 20 uppermost arc plate 402 is defined by a space between the upper member 116 and the upper surface 214 of the uppermost securing ledge 210.

**[0011]** At one end of the slot is a stop member 218 that engages the leading edge 418 of the arc plate 402. The stop member 218 is resilient and deforms in the longitudinal direction of the slot 216, that is, the stop member 218 has shape 25 memory whereby it is biased back toward its original shape when the deforming force is removed. At the opposite end of the slot 216 is a resilient locking arm 224 having a locking tab 222 that engages the trailing end 416 of the arc plate 402 when the arc plate 402 is fully installed in the slot 216. The locking arm 224' resiliently deforms away from the opposed lower surface 212" when the arc plate 30 402' is inserted into the slot 216', thereby ensuring that the locking tab 222' does not impede the arc plate 402' as it is being inserted into the slot and being positioned in the housing 102. When the arc plate 402 is positioned and secured

in the slot **216**, the locking tab **222** engages the trailing end **416** of the arc plate **402**, which is forced against the locking tab **222** by the stop member **218'**, and the locking arm **224** exerts a force against the arc plate **402**, forcing the arc plate **402** against the opposed lower surface **212'**.

5 [0012] The opposing surfaces of the stop member **218** and the locking tab **222** are separated by a distance that is less than the distance between the leading end **412** and the trailing end **416** of the arc plate **402**. When the arc plate **402** is positioned and secured in the housing **102**, the stop member **218'** is deformed in the longitudinal direction away from the arc plate **402**, and the stop member **218'**  
10 exerts a longitudinal force against the arc plate **402**.

[0013] Although Figures 2 and 3 illustrate only one-half of the arc stack housing **102**, the illustrated structure is mirrored on the other half. Those skilled in the art will recognize that either one or two stop members **218** and either one or two locking tabs **222** can be used to position and secure the arc plates **402**  
15 without departing from the spirit and scope of the present invention.

[0014] In the illustrated embodiment, the arc stack housing **102**, including the lower ledge surface **212**, the upper surface **214**, the resilient rear stop **218**, the locking tab **222** and the locking arm **224**, is a molded assembly with the elements integrally molded together. With this embodiment, fabrication of the arc stack requires only that the arc plates **402** be inserted and secured in the arc stack housing **102**. Additionally, the spring action of the locking arm **224** and the spring action of the rear stop **218** serve to capture and prevent the arc plate **402** from  
20 vibrating in the housing **102**.

[0015] From the foregoing description, it will be recognized by those skilled in the art that an apparatus for securing the arc plates in an arc stack has been provided. The arc stack housing is fabricated of an insulating material and the arc plates are fabricated of a conducting material. The arc plates are positioned in slots in the arc stack during fabrication. The integral locking mechanism secures the arc plates after the plates are fully inserted into the housing.  
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**[0016]** While the present invention has been illustrated by description of several embodiments and while the illustrative embodiments have been described in considerable detail, it is not the intention of the applicant to restrict or in any way limit the scope of the appended claims to such detail. Additional advantages 5 and modifications will readily appear to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus and methods, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or scope of applicant's general inventive concept.